WHAT IS CLAIMED IS:

1. A process for preparing a TiO_2 thin film having photo-induced antibacterial and antivirus activities comprising the steps of:

a) providing a reverse micelle solution comprising highly-dispersed nano-droplets comprising an organic continuous phase, a non-ionic surfactant, and water;

b) adding a titanium alkoxide to the reverse micelle solution and subjecting the titanium alkoxide to hydrolysis in said nano-droplets of the reverse micelle solution to form a TiO_2-containing solution;

c) forming a wet film comprising the TiO_2-containing solution onto a substrate, wherein the forming step is performed by a dip coating technique; and

d) drying the wet film and calcining the dried film.

2. The process of Claim 1, wherein said reverse micelle solution further comprises a stabilizer comprising a 2,4-diketone.

3. The process of Claim 2, wherein said non-ionic surfactant is Triton; said organic continuous phase comprises a C_{3-8} alkane; said titanium alkoxide comprises a C_{1-6} alkyl titanate; and said stabilizer is acetyl acetone.

4. The process of Claim 3, wherein said non-ionic surfactant is Triton X-100; said organic continuous phase is cyclohexane; and the titanium alkoxide is selected from group consisting of ethyl titanate, propyl titanate, iso-propyl titanate, n-butyl titanate, and iso-butyl titanate.

5. The process of Claim 4, wherein said non-ionic surfactant has a molar concentration of 0.15 to 0.4M; the titanium alkoxide has a molar concentration of 0.1 to 0.4M; and said stabilizer accounts for 2 to 5% by volume in the reverse micelle solution.

6. The process of Claim 5, wherein said non-ionic surfactant has a molar concentration of 0.2M; and the titanium alkoxide has a molar concentration of 0.2 to 0.3M in the reverse micelle solution.

7. The process of Claim 1, wherein step c) is performed with a withdrawal speed of 2-5mm/s, and step d) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

8. The process of Claim 2, wherein step c) is performed with a withdrawal speed of 2-5mm/s, and step d) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

9. The process of Claim 6, wherein step c) is performed with a withdrawal speed of 2-5mm/s, and step d) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

10. The process of Claim 9, wherein said dried film is calcined for 3 hours.

11. The process of Claim 1, wherein said substrate is selected from the group consisting of metal, glass and ceramics.

12. The process of Claim 10, wherein said substrate is selected from the group consisting of metal, glass and ceramics.

13. The process of Claim 12, wherein said substrate is stainless steel.

14. A TiO_2 thin film prepared by the process of Claim 1.

15. A method for killing bacteria and viruses in an environment comprising the steps of:

a) exposing said bacteria and viruses to a TiO_2 thin film that has been prepared by coating a substrate with a reverse micelle solution to which a titanium alkoxide has been added, such that said thin film comprises nano-crystalline TiO_2; and

b) placing said TiO_2 thin film in the environment under ultraviolet irradiation.

16. The method of Claim 15, wherein said TiO_2 thin film has been prepared by the process that comprises the steps of:

a1) providing the reverse micelle solution, wherein the reverse micelle solution comprises highly-dispersed nano-droplets comprising an organic continuous phase, a non-ionic surfactant, and water;

a2) adding the titanium alkoxide to the reverse micelle solution and subjecting the titanium alkoxide to hydrolysis in said nano-droplets of the reverse micelle solution to form a TiO_2-containing solution;

a3) forming a wet film comprising the TiO_2-containing solution onto a substrate, wherein the forming step is performed by a dip coating technique; and

a4) drying the wet film and calcining the dried film.

17. The method of Claim 16, wherein said solution further comprises a stabilizer comprising a 2,4-diketone.

18. The method of Claim 16, wherein said non-ionic surfactant is Triton; said organic continuous phase comprises a C_{3-8} alkane; and said titanium alkoxide comprises a C_{1-6} alkyl titanate.

19. The method of Claim 17, wherein said non-ionic surfactant is Triton; said organic continuous phase comprises a C_{3-8} alkane; said titanium alkoxide comprises a C_{1-6} alkyl titanate; and said stabilizer is acetyl acetone.

20. The method of Claim 19, wherein said non-ionic surfactant is Triton X-100; said organic continuous is cyclohexane; and the titanium alkoxide is selected from the group consisting of ethyl titanate, propyl titanate, iso-propyl titanate, n-butyl titanate, and iso-butyl titanate.

21. The method of Claim 20, wherein said non-ionic surfactant has a molar concentration of 0.15 to 0.4M; the titanium alkoxide has a molar concentration of 0.1 to 0.4M; and said stabilizer accounts for 2 to 5% by volume in the reverse micelle solution.

22. The method of Claim 21, wherein said non-ionic surfactant has a molar concentration of 0.2M; and the titanium alkoxide has a molar concentration of 0.2 to 0.3M in the reverse micelle solution.

23. The method of Claim 16, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

24. The method of Claim 17, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

25. The method of Claim 18, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

26. The method of Claim 19, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

27. The method of Claim 20, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

28. The method of Claim 21, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a

temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

29. The method of Claim 22, wherein said step a3) is performed with a withdrawal speed of 2-5mm/s, and step a4) is performed with said wet film drying at a temperature ranging from 80° to 120°C for 0.5 to 1.5 hours and said dried film calcining at 600°C for 1 to 6 hours.

30. The method of Claim 29, wherein said dried film is calcined for 3 hours.

31. The method of Claim 15, wherein said substrate is selected from the group consisting of metal, glass and ceramics.

32. The method of Claim 16, wherein said substrate is selected from the group consisting of metal, glass and ceramics.

33. The method of Claim 30, wherein said substrate is selected from the group consisting of metal, glass and ceramics.

34. The method of Claim 32, wherein said substrate is stainless steel.

35. The method of Claim 33, wherein said substrate is stainless steel.